VTU PREVIOUS QUESTION PAPER JUL/AUG 2022

QUESTION PAPER INDEX LIBRARY SECTION

I and IInd Semester

CBCS SCHEME

USN | | | | | | | | | |

21MAT21

Second Semester B.E. Degree Examination, July/August 2022
Advanced Calculus and Numerical Methods

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. Evaluate $\int\limits_{-c}^{c}\int\limits_{-b}^{b}\int\limits_{-a}^{a}(x^2 + y^2 + z^2)dxdydz$. (06 Marks)

b. Evaluate $\int\limits_{0}^{4a}\int\limits_{\frac{x^2}{4a}}^{2\sqrt{ax}}xy\,dydx$ by changing the order of integration. (07 Marks)

c. Prove that $\beta(m,n) = \dfrac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$. (07 Marks)

OR

2 a. Evaluate $\int\limits_{0}^{\infty}\int\limits_{0}^{\infty}e^{-(x^2+y^2)}dxdy$ by changing to polar coordinates. (06 Marks)

b. Find the area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$. (07 Marks)

c. Prove that $\int\limits_{0}^{\frac{\pi}{2}}\sqrt{\cot\theta}\,d\theta = \dfrac{\pi}{\sqrt{2}}$. (07 Marks)

Module-2

3 a. Find the directional derivative of $\phi = \dfrac{xz}{x^2 + y^2}$ at the point $(1, -1, 1)$ in the direction of $\hat{i} - 2\hat{j} + \hat{k}$. (06 Marks)

b. Find $\text{div}\,\vec{F}$ and $\text{curl}\,\vec{F}$, where $\vec{F} = \text{grad}(xy^3z^3)$. (07 Marks)

c. If $\vec{F} = (x + y + az)\hat{i} + (bx + 2y - z)\hat{j} + (x + cy + 2z)\hat{k}$, find a, b, c such that $\vec{F}$ is irrotational. (07 Marks)

OR

4 a. If $\vec{F} = xy\hat{i} + (x^2 + y^2)\hat{j}$, evaluate $\int\limits_{c}\vec{F}\cdot d\vec{r}$ along the curve $C: y = x^2 - 4$ in the xy-plane from the point $(2, 0)$ to $(4, 12)$. (06 Marks)

b. Using Green's theorem, evaluate $\int(y - \sin x)dx + \cos x\,dy$ where C is the triangle in the xy-plane bounded by the lines $y = 0$, $x = \dfrac{\pi}{2}$ and $y = \dfrac{2x}{\pi}$. (07 Marks)

c. Using Stokes theorem, evaluate $\oint\limits_{c}\vec{F}\cdot d\vec{r}$, where $\vec{F} = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken around the rectangle bounded by $x = 0$, $x = a$, $y = 0$, $y = b$. (07 Marks)

Module-3

5 a. Form the partial differential equation by eliminating the arbitrary function from $z = f(x^2 + y^2)$ **(06 Marks)**

b. Solve $\frac{\partial^2 z}{\partial x^2} = a^2 z$ given that $x = 0$, $z = 0$ and $\frac{\partial z}{\partial x} = a \sin y$. **(07 Marks)**

c. Derive one dimensional wave equation, $\frac{\partial^2 u}{\partial t^2} = C^2 \frac{\partial^2 u}{\partial x^2}$. **(07 Marks)**

OR

6 a. Form the partial differential equation by eliminating the arbitrary function from, $x + y + z = f(x^2 + y^2 + z^2)$ **(06 Marks)**

b. Solve $\frac{\partial^2 z}{\partial x \partial y} = \sin x \sin y$ for which $\frac{\partial z}{\partial y} = -2 \sin y$, when $x = 0$ and $z = 0$ when y is an odd multiple of $\frac{\pi}{2}$. **(07 Marks)**

c. Solve $(x + 2z)p + (4zx - y)q = (2x^2 + y)$ **(07 Marks)**

Module-4

7 a. Find a root of the equation $\tan x = x$ which is near to $x = 4.5$ using Newton's Raphson method. **(06 Marks)**

b. Given $\sin 45° = 0.7071$, $\sin 50° = 0.7660$, $\sin 55° = 0.8192$, $\sin 60° = 0.8660$ find $\sin 52°$ using Newton's forward interpolation formula. **(07 Marks)**

c. Evaluate $\int_0^1 \sqrt{\sin x + \cos x}\, dx$ correct to two decimal places using Simpson's $\frac{1}{3}^{rd}$ rule taking seven Equi distance ordinates. **(07 Marks)**

OR

8 a. Find the root of the equation $x \log_{10} x = 1.2$ that lies between 2 and 3 correct to three decimal places, using Regula Falsi method. **(06 Marks)**

b. Using Newton's divided difference formula find $f(4)$ given that,

x	0	2	3	6
f(x)	−4	2	14	158

(07 Marks)

c. Evaluate $\int_0^{0.3} \sqrt{1 - 8x^3}\, dx$ using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule by taking seven ordinates. **(07 Marks)**

Module-5

9 a. Solve $\frac{dy}{dx} = e^x - y$, $y(0) = 2$ using Taylor's series method upto 4th degree terms at any point x. **(06 Marks)**

b. Using modified Euler's method, find y at x = 0.2 from $\frac{dy}{dx} = 3x + \frac{y}{2}$ with $y(0) = 1$ taking h = 0.1 perform two iteration at each step. **(07 Marks)**

c. Solve $\frac{dy}{dx} = 2e^x - y$ given that $y(0) = 2$, $y(0.1) = 2.010$, $y(0.2) = 2.040$, $y(0.3) = 2.090$ find $y(0.4)$ using Milne's predictor corrector method. **(07 Marks)**

OR

10 a. Employ Taylor's series method to obtain the value of y at x = 0.1 for the equation $\frac{dy}{dx} = 2y + 3e^x$, $y(0) = 0$ considering upto 4th degree term. **(06 Marks)**

b. Use Runge Kutta method of order 4 find y at x = 0.2 given that $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$ taking h = 0.2. **(07 Marks)**

c. Apply Milne's predictor corrector method to find y(1.4) from $\frac{dy}{dx} = x^2 + \frac{y}{2}$ given that $y(1) = 2$, $y(1.1) = 2.2156$, $y(1.2) = 2.4549$, $y(1.3) = 2.7514$. **(07 Marks)**

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21CIV14/24

USN

First/Second Semester B.E. Degree Examination, July/August 2022
Elements of Civil Engineering and Mechanics

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a. Briefly enumerate the scope of following specialization/branches of civil engineering:
       i) Structural Engineering   ii) Transportation Engineering.   (10 Marks)
    b. Discuss the role of civil engineer in infrastructure development of a country. (05 Marks)
    c. Mention the properties and uses of aluminium in construction industry.   (05 Marks)

OR

2   a. Enlist the qualities of good building stone.   (06 Marks)
    b. What is glass? List its importance and application.   (06 Marks)
    c. Discuss the importance and application of smart materials in construction.   (08 Marks)

Module-2

3   a. Explain 'Principle of Transmissibility' with a neat sketch.   (04 Marks)
    b. Determine the resultant of four concurrent force system acting on a particle as shown in
       Fig.Q.3(b).   (08 Marks)

Fig.Q.3(b)
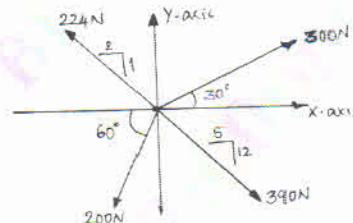
    c. The Fig.Q.3(c) shows a system of cables in equilibrium under two vertical loads of 300N
       and 500N acting at points B and C respectively. Determine the forces developed in all the
       cables.   (08 Marks)

Fig.Q.3(c)
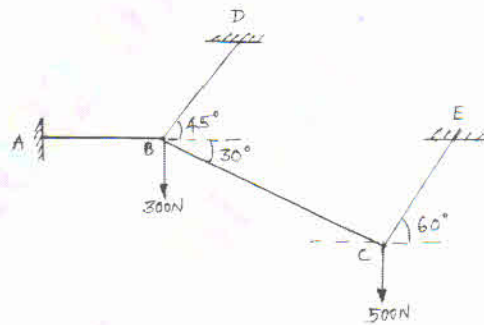
OR

4   a. Determine the magnitude, direction and position of the resultant of the force system shown
       in Fig.Q.4(a).   (10 Marks)

Fig.Q.4(a)
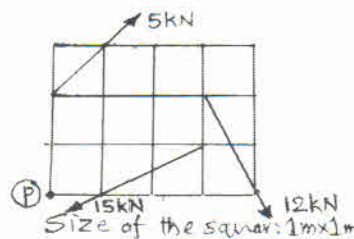
1 of 3

b. A block of mass 20kg placed on an inclined plane as shown in Fig.Q.4(b) is subjected to a force P acting parallel to the plane. The plane is inclined at an angle 30° to the horizontal with coefficient of friction being 0.24. determine the magnitude of P for
   i)   Motion of the body impending down the plane.
   ii) Motion of the body impending up the plane.   **(10 Marks)**
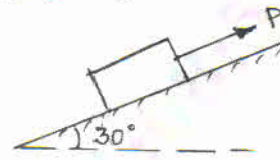
Fig.Q.4(b)

Module-3

5 a. Define the following:
   i)   Centroid
   ii) Axis of symmetry.   **(02 Marks)**

   b. Find the position of centroid of the given area shown in Fig.Q.5(b) with respect to reference axis. All dimensions are in m.   **(08 Marks)**
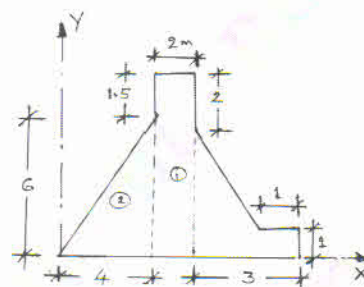
Fig.Q.5(b)

   c. Find the polar radious of gyration of the given area shown in Fig.Q.5(c) with respect to its centroidal axis. All dimensions are in mm.   **(10 Marks)**

Fig.Q.5(c)

OR
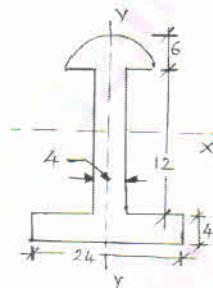
6 a. State and prove parallel axis theorem.   **(04 Marks)**

   b. Find the moment of inertia of a rectangular area with respect to its centroidal axis from first principles/method of integration.   **(06 Marks)**

   c. Locate the centroid of the shaded area shown in Fig.Q.6(c) with respect to the X and Y axis.
                                                                                       (10 Marks)

Fig.Q.6(c)

21CIV14/24
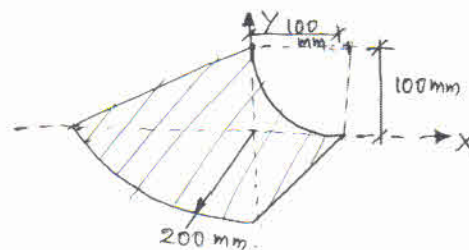
Module-4

7 a. Differentiate between 'determinate and indeterminate' structure with an example for each. **(06 Marks)**

b. Explain the different types of beams and supports. **(06 Marks)**

c. Determine reactions at A and E for the beam shown in Fig.Q.7(c). **(08 Marks)**
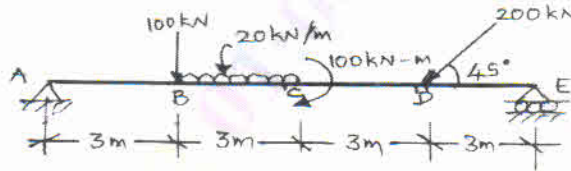
Fig.Q.7(c)

OR

8 a. List the assumptions made in the analysis of truss. **(04 Marks)**

b. Explain different types of loads. **(03 Marks)**

c. Determine the magnitude and nature of forces in the members of the truss shown in Fig.Q.8(c) by method of joints. **(13 Marks)**
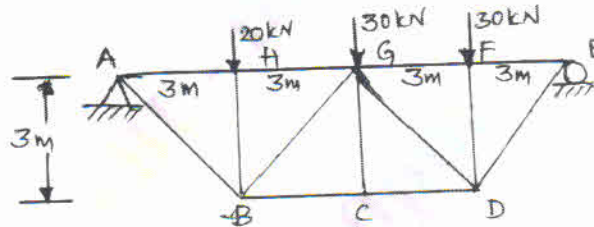
Fig.Q.8(c)

Module-5

9 a. What is Super elevation? Why it is required? **(04 Marks)**

b. Two cars P and Q accelerates from a standing start. The acceleration of P is $1.3 m/s^2$ and that of Q is $1.6 m/s^2$. If Q starts initially 6m behind P, how long it takes to overtake P? **(08 Marks)**

c. A stone 'A' is dropped from a tower of 50m height. At the same height, another stone B is thrown up from the front of the tower with velocity of 25m/s. At what distance from top and after how much time the two stones will cross each other. **(08 Marks)**

OR

10 a. State D' Alembert's principle. Mention its application for the case of plane motion. **(04 Marks)**

b. Two stones A and B are projected from the same point at an inclination of $45°$ and $30°$ respectively to the horizontal. Find the ratio of velocities of projection of A and B, if the maximum height reached by them is same. **(08 Marks)**

c. A pilot flying his bomber at a height of 2000m with uniform horizontal velocity of 600kmph wants to strike a target. At what distance from the target he should release the bomb. **(08 Marks)**

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21EME15/25

USN

First/Second Semester B.E. Degree Examination, July/August 2022
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 steam tables is permitted.

Module-1

1   a. Discuss the various emerging trends and technologies in different sectors and their contribution to GDP. **(06 Marks)**
    b. Draw T-h diagram of steam formation and label the various properties of steam on it. **(06 Marks)**
    c. Describe the energy conversion from hydel energy into electrical energy with the aid of suitable sketch. **(08 Marks)**

OR

2   a. Explain the working of centrifugal pump with a sketch. **(08 Marks)**
    b. Find the enthalpy of one kg of steam at 12 bar when
       i)   Steam is 22% wet
       ii) Steam is dry saturated
       iii) Superheated to 250°C
       Assume specific heat of super heated steam as 2.25 kJ/kg K. the values of steam properties at 12 bar are $t_s = 188°C$, $h_f = 798.43$ kJ/kg, $h_{fg} = 1984.3$ kJ/kg. **(06 Marks)**
    c. Briefly explain the working of tidal power plant and mention its limitations. **(06 Marks)**

Module-2

3   a. Explain the non ferrous metals with their applications. **(06 Marks)**
    b. Distinguish between Soldering, Brazing and Welding. **(06 Marks)**
    c. Compare TIG and MIG welding with sketches. **(08 Marks)**

OR

4   a. Why is cooling necessary for electronic devices? Discuss Active, Passive and Hybrid cooling. **(06 Marks)**
    b. How are composites classified? Mention their applications. **(06 Marks)**
    c. What are smart materials and shape memory alloys? Explain. **(08 Marks)**

Module-3

5   a. Draw a neat sketch of internal combustion engine and label the components. **(06 Marks)**
    b. Explain the concept of electric vehicle with components. **(08 Marks)**
    c. List the desirable properties of good refrigerant. **(06 Marks)**

OR

6   a. Explain the working of window type air conditioning system with neat sketch. **(10 Marks)**
    b. The following observations were made during a test on a two stroke cycle oil engine. Bore = 200mm, stroke = 250mm, Speed = 350 rpm, Brake drum diameter = 1200mm, Net brake load = 450N, mean effective pressure = 2.8bar, oil consumption = 3.6 kg/hr, calorific value of oil = 41868 kJ/kg. Determine IP, BP mechanical efficiency, indicated thermal efficiency and brake thermal efficiency. **(10 Marks)**

Module-4

7 a. Illustrate with sketches differences between simple and compound gear train. **(08 Marks)**
   b. Find the length of an open belt driving two parallel shafts 2m apart, connected by two pulleys of 0.1m and 0.8m diameter. Also determine the additional length of belt required if cross belt drive is used. **(08 Marks)**
   c. Define the terms :
      i) Machine
      ii) Mechanism. **(04 Marks)**

OR

8 a. Classify and explain the types of robots configuration. **(10 Marks)**
   b. List and explain the types of Gears. **(05 Marks)**
   c. Mention the applications of Chains and Ropes. **(05 Marks)**

Module-5

9 a. Explain the following lathe operations with sketches.
      i) Facing
      ii) Taper turning
      iii) Knurling. **(10 Marks)**
   b. Describe the working of CNC system and mention its applications. **(10 Marks)**

OR

10 a. Define milling. Explain the working of horizontal spindle milling machine. **(10 Marks)**
    b. Explain the concept of open loop and closed loop system in mechatronics. **(05 Marks)**
    c. Discuss the concept of smart manufacturing. **(05 Marks)**

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2 of 2
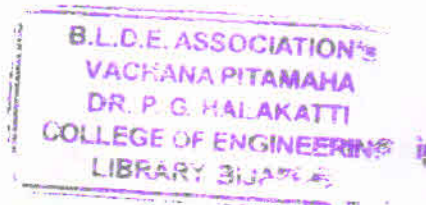
USN ☐☐☐☐☐☐☐☐☐☐

21PHY12/22

First/Second Semester B.E. Degree Examination, July/August 2022
Engineering Physics

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Draw neat sketches wherever necessary.
3. Constants : Electron mass $M = 9.1×10^{-31}$ kg, Electron charge $e = 1.6×10^{-19}$ C,
Velocity of light $C = 3×10^8$ m/s, Planck's constant $h = 6.626×10^{-34}$ Js,
Avagadro number $N_A = 6.025×10^{26}$/k mol,
Permitivity of free space $\epsilon_0 = 8.854×10^{-12}$ F/m,
Acceleration due to gravity $g = 9.8$ m/s^2, Boltzman constant $K = 1.38×10^{-23}$ J/K

Module-1

1 a. What are forced oscillations? Obtain expression for displacement of forced oscillations.
   (08 Marks)
   b. With a neat diagram explain the construction and working of Reddy's shock tube. **(08 Marks)**
   c. For a particle executing simple harmonic motion amplitude is 13m and period is 2π sec. Find its velocity when the displacement is 5m from the mean position. **(04 Marks)**

OR

2 a. Find the effective spring constant in case of spring connected in series and parallel combination. **(08 Marks)**
   b. Define SHM and mention any two examples. Obtain differential equation of motion for SHM and its natural frequency of oscillation. **(08 Marks)**
   c. A mass of 2 kg suspended by a spring of force constant 51.26 N/m is executing damped SHM with a damping 5 kg/s. Identify whether it is the case of underdamping or of overdamping. Also estimate the value of damping required for the oscillation to be critically damped (Ignore the mass of spring) **(04 Marks)**

Module-2

3 a. Using Schrodinger wave equation, obtain the eigen function and eigen value for a particle in a box. **(09 Marks)**
   b. State Heisenberg Uncertainty Principle. Show that an electron does not exists inside the nucleus on the basis of Heisenberg Uncertainty Principle. **(07 Marks)**
   c. Calculate the energy of the neutron in eV, if its deBroglie wavelength is $3 \overset{\circ}{A}$ and $m_n = 1.67×10^{-27}$ kg. **(04 Marks)**

OR

4 a. Discuss the spectral radiancy in Black body? Deduce Wein's law and Rayleigh-Jean's law from Planck's radiation law. **(09 Marks)**
   b. Setup one-dimensional time-independent Schrodinger wave equation. **(07 Marks)**
   c. An electron is bound in a 1-dimensional box of 0.1 nm length. Calculate the energy required to excite it from its ground state to third excited state. **(04 Marks)**

Module-3

5 a. Explain the requisites for a laser action? Obtain the expression for energy density using Einstein's coefficients at thermal equilibrium condition. **(10 Marks)**

   b. With neat diagram explain the principle, construction and working of phase modulated temperature sensor. **(06 Marks)**

   c. How many photons of yellow light of wavelength $5500 \,\overset{\circ}{A}$ constitutes 1.5 J of energy. **(04 Marks)**

OR

6 a. Explain the construction and working of carbon dioxide laser with the help of energy level diagram. **(09 Marks)**

   b. What is numerical aperture? Derive the expression for acceptance angle of an optical fiber. **(07 Marks)**

   c. Calculate the refractive indices of core and cladding of a given optical fiber with numerical aperture of 0.22 and fractional index change variation 0.012. **(04 Marks)**

Module-4

7 a. Mention any three assumptions of classical free electron theory? Discuss the success of Quantum free electron theory. **(09 Marks)**

   b. Obtain expression for electrical conductivity in semiconductors. **(07 Marks)**

   c. The dielectric constant of He gas at NTP is 1.0000684. Calculate the electronic polarisability of He atoms if the gas contains 2.7×10^{28} atom/m^3. **(04 Marks)**

OR

8 a. What is Hall Effect? Obtain expression for Hall voltage and express Hall voltage in terms of Hall coefficient. **(09 Marks)**

   b. What is polarization? Explain different types of polarization. **(07 Marks)**

   c. Find the temperature at which there is 1% probability that a state with an energy 0.5 eV above Fermi energy is occupied. **(04 Marks)**

Module-5

9 a. With a neat diagram, explain the principle, construction and working of Atomic Force Microscope. **(10 Marks)**

   b. What are nano-materials and classify the nano materials based on the dimensional constraints. **(05 Marks)**

   c. GaAs has its principle planes separated at $5.6534 \,\overset{\circ}{A}$. The first order Bragg reflection is located at $13° \, 40'$. Calculate
   (i) The wavelength of the x-ray
   (ii) The angle for second order Bragg reflection. **(05 Marks)**

OR

10 a. Explain the construction and working of x-ray diffractometer. **(07 Marks)**

   b. Describe the principle, construction and working of scanning electron microscope with the help of neat diagram. **(08 Marks)**

   c. Determine the crystal size given the wavelength of x-ray 12 nm, the peak width 0.5° and peak position 23° for a cubic crystal. Given K = 0.94. **(05 Marks)**

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USN | | | | | | | | | | 21CHE12/22

First/Second Semester B.E. Degree Examination, July/August 2022
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. Define Single Electrode Potential. Derive Nernst equation for Single Electrode Potential.
                                                                              (07 Marks)
    b. Explain the construction and working of glass electrode.   (07 Marks)
    c. Describe the construction and working of lithium ion battery. Mention its applications.
                                                                              (06 Marks)

OR

2   a. What are Reference Electrodes? Discuss the construction and working of Calomel electrode.
                                                                              (07 Marks)
    b. Calculate the single electrode potential of copper electrode at 28°C. Given that standard electrode potential of Cu is 0.34V and concentration of Cu^{2+} ions is 0.012m. (07 Marks)
    c. Distinguish between Primary , Secondary and Reserve batteries.   (06 Marks)

Module-2

3   a. Explain the following factors which affect the rate of corrosion :
        i)   Ratio of Anodic and Cathodic area   ii)   Nature of corrosion product.   (07 Marks)
    b. What is Electroless Plating? Distinguish between Electroplating and Electroless plating.
                                                                              (07 Marks)
    c. Describe differential Metal corrosion and Water line corrosion.   (06 Marks)

OR

4   a. Explain Sacrificial anode and Impressed current method of corrosion control.   (07 Marks)
    b. What is meant by Metal finishing? Mention technological importance of Metal finishing.
                                                                              (07 Marks)
    c. A steel sheet area 400cm³ (62 in²) is exposed to moist air. After one year period it was found to experience a weight loss of 375g due to corrosion. If the density of steel is 7.9 g/cm³, calculate the CPR in mpy and mmy^{-1}. Given that K = 534 in mpy and 87.6 in mmy^{-1}.
                                                                              (06 Marks)

Module-3

5   a. What are Polymer Composites? Explain the synthesis , properties and applications of Kevlar.
                                                                              (07 Marks)
    b. Describe the mechanism of conduction in Polyaniline.   (07 Marks)
    c. Discuss the properties and applications of Carbon nanotubes.   (06 Marks)

OR

6   a. Explain the synthesis , properties and application of Polymethane.   (07 Marks)
    b. What are Biodegradable polymers? Explain the synthesis , properties and applications of Polylactic acid.
                                                                              (07 Marks)
    c. What are Nanomaterials? Describe the synthesis of Nano materials by Sol – Gel process.
                                                                              (06 Marks)

Module-4

7 a. Define Green chemistry. Briefly explain basic principles of Green chemistry. **(07 Marks)**

   b. Discuss the synthesis of Adipic acid by conventional route from benzene and green route from glucose. **(07 Marks)**

   c. Describe the construction and working of Methanol – Oxygen fuel cell. **(06 Marks)**

OR

8 a. Explain the synthesis of Paracetamol by conventional and green route from phenol. **(07 Marks)**

   b. Describe the production of hydrogen by photocatalytic water Splitting method. **(07 Marks)**

   c. Explain the construction and working of Photovoltaic cell. **(06 Marks)**

Module-5

9 a. Explain the Theory , Instrumentation and Applications of Colorimetry. **(07 Marks)**

   b. Discuss the determination of hardness of water by EDTA method. **(07 Marks)**

   c. Define the following terms :

   i) Normality   ii)   Molarity   iii) Mole fraction. **(06 Marks)**

OR

10 a. Explain the theory and any two applications of Conductometric Analysis. **(07 Marks)**

   b. In a COD experiment, 24.8 and 16.6cm3 of 0.2N FAS solutions are required for blank and sample titration respectively. The volume of test sample used was $25cm^3$. Calculate COD of the sample solution. **(07 Marks)**

   c. What are Primary and Secondary standards? Explain the requirements of Primary Standard solution. **(06 Marks)**

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CBCS SCHEME

21EGH28

USN [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Question Paper Version : A

Second Semester B.E./B.Tech./B.Arch/B.Planning Degree Examination, July/August 2022
Professional Writing Skills in English
(COMMON TO ALL BRANCHES)

Time: 2 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.

General English Grammar: Select the correct option.

1. Her thinking leans _____ democracy.
   a) with   b) towards   c) for   d) None of these

2. He got too tired _____ over work.
   a) because of   b) because off   c) on   d) for

3. _____ his principles, he has to be very careful.
   a) with regard of   b) with regard on   c) with regard to d) None of these

4. Building has been built _____ the new plan.
   a) accordance to   b) in accordance with   c) for   d) about

5. He crossed the broken bridge _____ warning.
   a) in spite of   b) in spite off   c) on   d) about

6. Which of these do not deal with precise information?
   a) Engineer   b) Scientist   c) Technician   d) Fiction writer

7. In an office, an employee communicates horizontally with his _____
   a) superiors   b) subordinates   c) colleagues   d) assistant

8. An average length of sentence in a paragraph should be _____
   a) 15 to 20 words   b) 25 to 30 words   c) 2 to 5 words   d) 5 to 10 words

9. Which of these is not a feature of a paragraph?
   a) Length   b) Unity   c) Incoherence   d) Correctness

10. Which of these is not an important feature of a paragraph?
    a) Length   b) Breadth   c) Unity   d) Coherence

11. Resume is called curriculum vitae in _____
    a) India   b) France   c) North America   d) South America

12. Which of these letters are in response to an advertisement?
    a) Solicited letters   b) Unsolicited letters
    c) Letters of enquiry   d) Letters of complaint

13. Which of these letters of application must include a statement of the writer's age?
    a) For complain   b) For employment   c) For enquiry   d) For adjustment

14. Technical writing demands _____ use of language.
    a) figurative   b) poetic   c) factual   d) dramatic

15. Which of these must be avoided in technical writing?
    a) Facts   b) Grammar
    c) Punctuation   d) Personal feelings

16. Which of these words is used in technical writing?
    a) Apex   b) Top   c) Slanting   d) Bottom

17. Which of these is a technical word for slanting?
    a) Lateral   b) Sloping   c) Tilting   d) Bent

18. Which of these should be avoided for an effective speech?
    a) Planning of speech   b) Preparation of speech
    c) Long sentences   d) Organization

19. Which of these should be avoided during the delivery of a speech?
    a) Confidence   b) Clarity   c) Pauses   d) Rudeness

20. Which of these is not a type of public speech?
    a) Short speech   b) Informal speech
    c) Written speech   d) Professional speech

General English Questions on Pronoun Correction:

21. Correct the sentence if necessary. One should respect his elders.
    a) One should respect his elders.   b) One should respect her elders.
    c) One should respect one's elders.   d) None of these.

22. Correct the sentence if necessary. One should respect his own country.
    a) One should respect his own country.   b) One should respect her own country.
    c) One should respect their own country.   d) One should respect one's country.

23. Correct the sentence if necessary. One must love his parents.
    a) One must love her parents.
    b) One must love his parents.
    c) One must love their parents.
    d) One must love one's parents.

24. Correct the sentence if necessary. I and Jimmy went home.
    a) I and Jimmy went home.
    b) Jimmy and I went home.
    c) a and b
    d) None of these.

25. Correct the sentence if necessary. I and she are friends.
    a) I and she are friends.
    b) She and I are friends.
    c) She and me are friends.
    d) None of these.

26. Correct the sentence if necessary. I and Dhoni went to college.
    a) I and Dhoni went to college.
    b) Dhoni and I went to college.
    c) Dhoni and me went to college.
    d) None of these.

27. Correct the sentence if necessary. Both he and you must attend the meeting.
    a) Both he and you must attend the meeting.
    b) Both you and he must attend the meeting.
    c) a and b
    d) None of these.

28. Correct the sentence if necessary. Peter invited me and you to dinner.
    a) Peter invited you and me to dinner.
    b) Peter invited me and you to dinner.
    c) a and b
    d) None of these.

29. Correct the sentence if necessary. I, you and she can do it.
    a) I, you and she can do it.
    b) You, I and she can do it.
    c) You, she and I can do it.
    d) She, you and I can do it.

30. Correct the sentence if necessary. None of the three questions are simple.
    a) None of the three questions are simple.
    b) None of the three questions is simple.
    c) a and b
    d) None of these.

General English Questions on Adjectives:

31. Correct the sentence if necessary. She is senior than me.
    a) She is senior than me.
    b) She is senior to me.
    c) She is senior then me.
    d) None of these.

32. Correct the sentence if necessary. He is junior than me.
    a) He is junior than me.
    b) He is junior then me.
    c) He is junior to me.
    d) None of these.

33. Correct the sentence if necessary. He is senior to her.
    a) He is senior than her.
    b) He is senior then her.
    c) He is senior to her.
    d) None of these.

34. This is preferable than that.
    a) This is preferable than that.
    b) This is preferable then that.
    c) This is preferable to that.
    d) None of these.

35. My sister is elder than me.
    a) My sister is elder than me.   b) My sister is elder to me.
    c) My sister is elder then me.   d) None of these.

Questions on Verb Correction:

36. Correct the sentence if necessary. The girl is taking biscuits every day.
    a) The girl is taking biscuits every day.   b) The girl takes biscuits every day.
    c) The girls is taken biscuits every day.   d) None of these.

37. Correct the sentence if necessary. He takes milk every day.
    a) He takes milk every day.   b) He is taking milk every day.
    c) He is taken milk every day.   d) None of these.

38. Correct the sentence if necessary. They are coming here regularly.
    a) They are coming here regularly.   b) They are come here regularly.
    c) They come here regularly.   d) None of these

39. I am studying every morning from 5-8 A.M.
    a) I am studying every morning from 5-8 A.M.
    b) I have been studying every morning from 5-8 A.M.
    c) I study every morning from 5-8 A.M.
    d) None of these.

40. Every evening, he is going for a walk.
    a) Every evening, he is going for a walk.
    b) Every evening, he goes for a walk.
    c) Every evening, he has been going for a walk.
    d) None of these.

41. A writer must not convey information with _____.
    a) precision   b) clarity   c) randomness   d) truth

42. Which of these are to be avoided in any style of writing?
    a) Truth   b) Clarity   c) Compassion   d) Dishonesty

43. Which of these reports are used in business?
    a) Formal technical reports   b) Informal reports
    c) Personal reports   d) Musical reports

44. Which of the following is NOT a method of writing a non-formal letter?
    a) Filling in a blank form   b) Form of a letter
    c) Form of a memorandum   d) Formal of a notice

45. A non-formal report written in the form of letter is similar to a _____.
    a) friendly letter   b) business letter   c) complaint letter   d) notice

46. Which of these does not come under reports?
    a) News items   b) Memorandums   c) Notice   d) Report cards

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47. Which of these is not a parameter of a formal report?
    a) Presentation   b) Complaint   c) Information   d) Request

48. Meaning of "Fly by night"
    a) Night journey   b) A bird busy in night
    c) Cat's eye   d) Swindler

49. Synonym of Exhort
    a) Weak Plea   b) To urge strongly   c) Beg   d) Borrow

50. Antonym of Blunt
    a) Easy   b) Lazy   c) Sharp   d) Speedy

51. Antonym of Brave
    a) Achieve   b) Gain   c) Give   d) Cowardly

52. Synonym of Abjure
    a) To give   b) To take back   c) Happy   d) Sorry

53. Synonym of Abrogate
    a) Create   b) Run   c) Fascinate   d) Abolish

54. Unfortunately, he _____ a lot of money to the bank.
    a) Borrowed   b) Owed   c) Deposited   d) Lent

55. I _____ the apartment all day yesterday.
    a) Clear   b) Washed out   c) Cleaned up   d) None of these

56. The train _____ as fast as the bus.
    a) went   b) running   c) moves   d) going

57. He was seen _____ to the school.
    a) went   b) going   c) gone   d) go

58. She _____ in the sun for 1 hour
    a) sitting   b) has been sitting   c) has been sit   d) has sit

59. _____ it help you in your studies?
    a) will   b) was   c) is   d) are

60. I _____ never seen such a picture before
    a) did   b) was   c) have   d) has

61. Words of same sound is?
    a) Soundnyms   b) Antonyms   c) Homonyms   d) None of these

62. Sounding the same but spelt differently?
    a) Symphonious   b) Homophonous   c) Synonyms   d) Saminymous

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63. Choose the correct answer?
    a) My friend has got a new job
    b) My friend has got a new work
    c) My friend is got a new job
    d) My friend did got a new job

64. Choose the correct sentence.
    a) Do you like a glass of water?
    b) Would you like a glass of water?
    c) Would you like the glass of water?
    d) Do you like the glass of water?

65. Antonym of Ad-lib?
    a) Improvise
    b) Extemporized
    c) Deliberate
    d) Spontaneous

66. We _____ at the party.
    a) Enjoyed ourself
    b) Enjoyed ourselves
    c) Played with
    d) None of these

67. Choose a correct sentence below :
    a) There are seven girls in the class.
    b) There is seven girls in the class.
    c) There are seven girl in the class.
    d) There is seven girl in the class.

68. I _____ a letter to the Principal yesterday
    a) write
    b) forward
    c) mailed
    d) have signed

69. Choose the correct statement :
    a) Although he was hurt, but he continued to walk.
    b) Although he was hurt, he continued to walk.
    c) He was hurt, he continued to walk.
    d) Although he continued to walk, he was hurt.

70. Choose the correct statement :
    a) There were between 8 to 10 policemen present.
    b) There were between 8 and 10 policemen present.
    c) There were among 8 to 10 policemen present.
    d) There were atleast 8 and 10 policemen present.

71. Meaning of See Eye to Eye
    a) To agree fully
    b) Not agreeing fully
    c) In a battle field
    d) Angry

72. He _____ a very good grade in the examination
    a) Earned
    b) Given
    c) Received
    d) None of these

73. We _____ at the party late
    a) arrived
    b) went
    c) played
    d) saw

74. The patient _____ in his sleep
    a) Woke up
    b) Died
    c) Cried off
    d) None of these

75. I was delighted _____ her answer.
    a) On
    b) At
    c) For
    d) In

76. I have no doubt _____ it.
    a) At
    b) On
    c) Upon
    d) About

77. I assure you _____ your safety
   a) Off   b) Of   c) From   d) With

78. He competed _____ me for the prize.
   a) Off   b) With   c) To   d) Of

79. He is _____ difficulties
   a) In   b) On   c) From   d) With

80. He is true _____ his words
   a) With   b) On   c) To   d) For

81. The fan is _____ my head
   a) Above   b) On   c) To   d) With

82. You can see the house _____ the trees
   a) To   b) On   c) With   d) Among

83. Which of these is not a characteristic of a good essay?
   a) Brevity   b) Dignified style   c) Fakeness   d) Personal touch

84. Which of these should be avoided in a good essay?
   a) Slang   b) Dignified words   c) Brevity   d) Unity

85. Which of these is not a type of essay?
   a) Narrative essay   b) Descriptive essay   c) Argumentative essay   d) Personal essay

86. Which of these essays tells a story?
   a) Narrative essays   b) Descriptive essays
   c) Reflective essays   d) Argumentative essays

87. In which of these essays, the writer arrives at a conclusion by logical reasoning?
   a) Narrative essays   b) Descriptive essays
   c) Reflective essays   d) Argumentative essays

88. _____ essays are a collection of one's thoughts
   a) Narrative   b) Expository   c) Argumentative   d) Reflective

89. Which of these explains a subject?
   a) Narrative essays   b) Expository essays
   c) Argumentative essays   d) Reflective essays

90. Which kind of essay uses the five senses (touch, smell, taste, sound, sight) to enhance the imagery of the setting?
   a) Narrative essays   b) Descriptive essays
   c) Expository essays   d) Argumentative essays

91. Indirect speech is also called as :
   a) Reported speech   b) Quoted speech   c) Simple speech   d) Principal speech

92. A _____ report provides information on scientific tests carried out by engineers or scientists
    a) progress   b) periodic   c) laboratory   d) trouble

93. Convert the following direct speech to indirect :
    She said, "My mother is cooking food".
    a) She said that her mother was cooking food.
    b) She said that my mother was cooking food
    c) She said that her mother is cooking food.
    d) She said that my mother is cooking food.

94. Change the speech for the following statement :
    She said, "The man died in the afternoon".
    a) She said the man died in the afternoon.
    b) She said that the man had died in the afternoon.
    c) She had said the man died in the afternoon.
    d) She said the man was dead in the afternoon.

95. Convert the following statement in direct speech to indirect:
    He said to me, "I don't believe you".
    a) He said he didn't believe me.   b) He said I don't believe you.
    c) He said he don't believe me.   d) He said I didn't believe you.

96. If the subject is of singular number, third person; in what number and person will the verb be?
    a) Singular number, first person.   b) Singular number, third person.
    c) Plural number, first person.   d) Plural number, third person.

97. Fill in the blank: Neither he nor I _____ present.
    a) were   b) was   c) are   d) am

98. Convert the affirmative sentence into a negative sentence:
    Mili is prettier than Neha.
    a) Neha is not as pretty as Mili.   b) Mili is not as pretty as Neha.
    c) Neha is not as prettier as Mili.   d) Mili is not prettier than Neha.

99. Convert the following interrogative sentence to an assertive sentence:
    Who would not love his country?
    a) No one loves his country.   b) Everyone loves his country.
    c) Someone loves his country.   d) Everyone loves the country.

100. Convert the following compound sentence into a simple sentence:
    We must eat, or we cannot live.
    a) We must live to eat.   b) We must eat to live.
    c) We can't live if we eat.   d) We can't eat if we live.

CBCS SCHEME

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Question Paper Version : C

First/Second Semester B.E./B.Tech./B.Arch./B.Planning Degree Examination, July/August 2022
Scientific Foundations of Health
(COMMON TO ALL BRANCHES)

Time: 1 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.

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1. Communication is a
   a) Art of transmitting information, ideas and attitudes from one person
   b) Tool for controlling and motivating people
   c) We can't influence others without communication
   d) (a) and (b)

2. Communication strengthens _____ and _____ relationships in an organization.
   a) Employee and Employer   b) Employee and Father
   c) Father and Mother   d) Friends and Colleagues

3. Our dress code is an example of _____ communication.
   a) Verbal   b) Non-verbal
   c) Written   d) Spoken

4. From the following identify the skills promoted by communication
   (i) Reading and listening
   (ii) Listening and helping
   (iii) Helping and speaking
   (iv) Speaking and writing

   a) (i) and (ii) only   b) (ii) and (iii) only
   c) (i) and (iv) only   d) (iii) and (iv) only

5. Which of the following is not a barrier of effective listening?
   a) Engaging inside conversations
   b) Mentally preparing what you will say next
   c) Being present in the moment
   d) Making judgment about the speaker

6. Body language and facial expressions are related to
   a) Object communication
   b) Written communication
   c) Oral communication
   d) Non-verbal communication

7. Negative characteristics of friendships include all of the following except:
   a) Unsupportive
   b) Oppressive
   c) Criticize in a joking manner
   d) Solve problems together

8. Basic instincts of human life
   a) Self preservation
   b) Sexual
   c) Social
   d) All of these

9. What are the steps to increase the vocal clarity
   a) Keep your language simple
   b) Slow down during conversation
   c) Feedback
   d) Both (a) and (b)

10. What is the goal of social engineering?
    a) Sabotage a person's social media
    b) To gain vital personal information
    c) To catfish someone
    d) To build trust

11. How are infectious diseases, such as colds and influenza, most commonly spread?
    a) Breathing viruses in
    b) Hand-to-face contact
    c) Drinking infected water
    d) Eating contaminated food

12. Which is the most important hygiene habit to teach young children?
    a) Use a tissue to cover a sneeze
    b) Don't share a glass or eating utensil
    c) Wash hands frequently
    d) Take a bath daily

13. Chronic stress has been linked to which of these health problems?
    a) Headaches
    b) Constipation
    c) Depression
    d) All of these

14. Which of the following increases your risk for type 2 diabetes?
    a) Not getting enough exercise
    b) Eating too much sugar
    c) Being overweight
    d) (a) and (c)

15. According to CDC, when should infants start vaccines against serious diseases?
    a) Birth
    b) 2 months old
    c) 6 weeks old
    d) 6 months old

16. Modes of horizontal transmission of disease, except
   a) Contact
   b) Vector
   c) Common vehicle
   d) Genetic

17. An infected person is less likely to encounter a susceptible person when a large proportion of the members of the group are immune.
   a) Active immunity
   b) Passive immunity
   c) Herd immunity
   d) Specific immunity

18. Occurrence in the community of a number of cases of disease that is usually large or unexpected.
   a) Endemic
   b) Epidemic
   c) Pandemic
   d) Infection

19. Leading cause of diarrheal disease
   a) Enterotoxigenic Escherichia coli
   b) Salmonella (non-typhoid)
   c) Rotavirus
   d) Campylobacter jejuni

20. Mammography should be done annually in women of what age?
   a) 50 years old and above
   b) 60 years old and above
   c) 45 years old and above
   d) 30 years old and above

21. Alcohol abuse and smoke share a window of vulnerability especially during
   a) Adolescence
   b) Adulthood
   c) Middle age
   d) Old age

22. Adolescents involved in risky behaviours often have
   a) high self-esteem
   b) a large peer group
   c) poor self-control
   d) a tolerant attitude

23. Chemical dependence in generally known to start between the ages of _____
   a) 42 and 51
   b) 22 and 31
   c) 12 and 21
   d) 32 and 41

24. Alcoholics anonymous maintains that alcoholism is
   a) a disease that can be cured
   b) a disease that can be managed but never cured
   c) a problem only if a person starts experiencing its synergistic effects
   d) a serious problem only for binge drinkers

25. Which of the following is true of the synergistic effects of smoking?
   a) It helps to reduce stress and maintain a lower body weight
   b) It increases a person's likelihood of engaging in physical exercises
   c) It enhances the detrimental effects of other risk factors
   d) It reduces the chances of early mortality

26. The interaction between weight and smoking can increase one's _____.
   a) Mortality
   b) Self control
   c) Deviant behaviour
   d) Fertility

2⁷ Which of the following is not a characteristic of addition?
a) Habitual behaviour
b) Loss of control
c) Negative consequence
d) Denial

28. Addiction involves an excessive
a) Tolerance for alcohol or drugs
b) Amount of debt or financial problems
c) Preoccupation with the addictive behaviour
d) Risk of losing one's job or failing out of school

29. Temporary physical and psychological symptoms that occur when use of an addictive substance is discontinued is
a) Relapse
b) Compulsion
c) Withdrawal
d) Addiction

30. Transdermal drug administration means that a drug is
a) Placed under the tongue
b) Injected into a vein
c) Absorbed through the skin
d) Inhaled

31. Which of the following components are major nutrients in our food?
a) Carbohydrates
b) Lipids and proteins
c) Vitamins and minerals
d) All of these

32. The benefits in eating a balanced diet
a) good health
b) good mood and energy
c) improved health and reduced illness
d) All of these

33. Nutritional means
a) Tastes really good
b) Tastes really bad
c) Containing necessary substances for the body to grow and stay healthy
d) Is mostly green

34. In a healthy diet as per WHO the amount of salt to be consumed by a person per day is
a) less than 5g
b) less than 5 mg
c) less than 50 mg
d) less than 0.5 g

35. BMI stands for
a) Body Material Index
b) Body Mass Index
c) Body Mass Indicator
d) None of these

3⁶ What is anorexia nervosa?
a) Nervous system blockage
b) Sleeping disorder
c) Eating disorder
d) Physical disability

37. Which of the following food items provides dietary fibre?
a) Pulses
b) Wholegrain
c) Fruits and vegetables
d) All of these

38. Which are intimately related?
    a) Diseases and health
    b) Body and health
    c) Body and mind
    d) Body and spiritual values

39. Exercise is often described as training and should include
    a) Exertion of the heart
    b) Exertion of the lungs
    c) Exertion of the muscles
    d) All of these

40. Exercising regularly should be a/an _____ not a short-term activity, so think of your progress as part of a long term plan to line better.
    a) Lifestyle
    b) Choice
    c) Obligation
    d) None of these

41. According to WHO, heath is
    a) A state of body and mind in a balanced condition.
    b) The reflection of a smiling face
    c) The symbol of economic prosperity
    d) A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity

42. Psychosis is characterized by
    a) Loss of touch with reality
    b) Prolonged emotional reaction to a given stress
    c) Anxiety, fear, sadness, vague aches and pains
    d) All the above

43. Which one of the following factors affects the development of child?
    a) Endocrinal glands
    b) Nutritious diet
    c) Diseases and injuries
    d) All of these

44. Which year did the World Health Organization first express the right to health as a Fundamental Human Right?
    a) 1946
    b) 1952
    c) 1987
    d) 2000

45. Which of these things is health psychology concerned with?
    a) What causes illness?
    b) Who is responsible for illness?
    c) How should illness be treated?
    d) All of these

46. Which of these is not an example of a health behaviour?
    a) Smoking
    b) Taking regular exercise
    c) Eating healthy food
    d) Going to the gym

47. Which statement is wrong in the context of personality?
    a) Personality is unique and specific
    b) Personality is a joint product of heredity and environment
    c) Personality spreads over the subconscious and unconscious behaviour of the person
    d) Personality is limited only to the appearance of a person

48. Who proposed the biopsychosocial model?
    a) Freud
    b) Sontag
    c) Engel
    d) None of these

49. Which of these is not a benefit of mindfulness?
    a) Reduced anxiety and stress
    b) Decreasing depression
    c) Decreased emotional regulation
    d) Better memory

50. Mental health hazards includes
    a) Anxiety
    b) Depression
    c) Organic mental disorders due to substance use
    d) All of the above

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CBCS SCHEME

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USN ☐☐☐☐☐☐☐☐☐☐

Question Paper Version : D

First/Second Semester B.E./B.Tech./B.Arch./B.Planning Degree Examination, July/August 2022
Innovation and Design Thinking
(COMMON TO ALL BRANCHES)

Time: 1 hr.]   [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.

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1. Design thinking principles do not include
   a) feasibility   b) viability   c) desirability   d) credibility

2. The final step in the Design thinking process is
   a) Test   b) Define   c) Ideate   d) Empathize

3. The three I's of Design thinking do not include
   a) Interest   b) Implementation   c) Inspiration   d) Ideation

4. Ram is creating a new food product using Design thinking approach. His first step is addressing who he is creating the product for and conducts research on understanding this target market. This step is :
   a) Define   b) Ideate   c) Empathize   d) Prototype

5. Collaborative teamwork is essential in design thinking for
   a) Making profit   b) Closing down the operations
   c) Better failure management   d) None of these

6. The ultimate goal of design thinking is to help designing:
   a) Better service   b) Better products   c) Both a and b   d) None of these

7. Design thinking is typically a
   a) Non-linear process   b) Linear process   c) Both a and b   d) None of these

8. Design thinking follows
   a) Waterfall model   b) Agile Methodology   c) Both a and b   d) None of these

9. _____ is an iterative and incremental method of managing development and design.
   a) Waterfall model   b) Agile Methodology   c) Cyclic model   d) All of these

10. BPM stands for
    a) Building Project Management   b) Basic Product Management
    c) Business Process Management   d) Business Product Management

11. What are the steps in Design Thinking Process in sequence?
    a) Define – Empathize – Ideate – Prototype – Test and Implement
    b) Test and Implement – Define – Empathize – Ideate – Prototype
    c) Empathize – Define – Ideate – Prototype – Test and Implement
    d) Ideate – Define – Empathize – Test and Implement – Prototype

12. Which of the following Firm is associated most with Design Thinking?
    a) IKEA   b) IDEO   c) IDEA   d) ASCI

13. In which step of Design Thinking approach, actual requirements together with un-met needs of customer/end-user is addressed:
    a) Empathize   b) Ideate   c) Define   d) Prototype

14. Which of the following is best suited to produce more innovative design solutions :
    a) Monodisciplinary and untrained teams   b) Monodisciplinary and trained teams
    c) Multidisciplinary and untrained teams   d) Multidisciplinary and trained teams

15. MVP stands for :
    a) Minimum Value Product   b) Moderate Value Product
    c) Minimum Viable Product   d) Maximum Viable Production

16. POV is :
    a) Pin Of View which is 1st part of Empathizing
    b) Point Of View which is last part of Define stage
    c) Point Of View which is last part of Testing
    d) Pin Of View which is last part of Prototype.

17. During which stage would you consult experts to learn more about the areas of concern and to gain an understanding of other people's experiences?
    a) Prototype   b) Define   c) Ideate   d) Empathize

18. Design thinking is :
    a) Thinking about design
    b) Designing ways in which people think
    c) Asking users to solve problems
    d) Defining, framing and solving problems from user's perspectives.

19. To Empathize, one has to
    a) Observe   b) Engage   c) Listen   d) All of these

20. Collecting _____ is an important portion of testing a prototype in the Test Stage of design thinking.
    a) Pictures   b) Money   c) Feedback   d) E-Mails

21. Agile methodology involved
    a) sprints   b) no iteration   c) profit   d) none of these

22. Which model provides better collaboration and communication?
    a) Waterfall model   b) Agile model   c) Both a and b   d) None of these

23. Major difference between Agile model and Water fall model is
    a) Agile model includes iteration   b) Waterfall model includes iteration
    c) BPM model include iteration   d) None of these

24. "Invest in user research" – here word "user research" belongs to
    a) Empathize   b) Design   c) Ideate   d) Testing

25. Parameters which are absolutely necessary in Agile model :
    a) Transparency   b) Inspection   c) Adaptation   d) All of these

26. _____ approach is used for designing complex software systems.
    a) Scenario based prototyping   b) BPM
    c) Both a and b   d) None of these

27. _____ is type of collaboration where participants regardless of their location, work together to reach a certain GOAL :
    a) Cloud Computing   b) Off-Line class   c) Distributed Collaboration   d) None of these

28. Digital space is also called as
    a) Cloud computing   b) Design analysis   c) Distributed Design   d) None of these

29. Example for Distributed collaboration
    a) Mobile Manufacturing   b) Machine manufacturing   c) Both a and b   d) None of these

30. Design thinking helps in the following :
    a) Innovation   b) Statistics   c) Data analysis   d) None of these

31. Being an experimental phase, continuous iterations can take place in which phase:
    a) Define   b) Empathize   c) Prototype   d) None of these

32. Which of the following is not tools of Design thinking?
    a) Co-creation   b) Prototyping   c) Mind Mapping   d) On-Line Marketing

33. Journey mapping maps which phase of activity of service for a customer?
    a) Before a service   b) During a service   c) After a service   d) All of these.

34. Value chain analysis examines how an organization interacts with value chain partners to _____ new offerings.
    a) Produce   b) market   c) Distribute   d) All of these.

35. A prototype is simple experimental model of a proposed solution used to :
    a) Test Ideas   b) Validate Ideas   c) Both a and b   d) None of these

36. A Hypothesis is _____.
    a) statement indicating the profitability of company
    b) statement indicating the Delivery time of a product
    c) conjecture that is grounded in support background originating from secondary research
    d) None of the above

37. What is you first model/design of a product called:
    a) Draft   b) Rough draft   c) Prototype   d) Practice design

38. To Ideate is :
   a) To change rapidly
   b) creating 3D model of your design
   c) Creating and sharing ideas using Images/Sketches to describe your idea
   d) Selling a product/service at huge profit

39. A case study is :
   a) Research strategy
   b) Emperical enquiry
   c) Descriptive and exploratory analysis
   d) All of these

40. At what step, POV (Point Of View) is completed :
   a) Empathy
   b) Prototype
   c) Define
   d) Ideate

41. The Tool which uses image and allow us to think nonverbally is
   a) Value chain analysis
   b) Journey mapping
   c) Visualization
   d) Assumption testing

42. Which tool is used as an ethnographic research method that focuses on tracing customer's journey?
   a) Journey mapping
   b) Rapid prototyping
   c) Visualization
   d) Mind mapping.

43. Which tool is used in generating hypothesis about potential new business opportunities:
   a) Rapid concept development
   b) Mind Mapping
   c) Both a and b
   d) None of these

44. In value chain analysis client activity includes :
   a) Order taking
   b) Scheduling
   c) Software development
   d) All of these

45. Which tool is designed to test the value generating assumptions of a potential new growth initiative?
   a) Visualization
   b) Mind Mapping
   c) Learning Launches
   d) None of these.

46. Select odd one out:
   a) Brain storming
   b) Mind Mapping
   c) Empathy
   d) Rapid concept

47. Which of the following statement is correct :
   a) Design thinking is Convergence-Divergence process
   b) Design thinking is Lean start-up process
   c) Design thinking is Linear process for product development
   d) None of the above.

48. In Design thinking, where does the information used to put together a problem statement came from:
   a) The Define stage
   b) Empathize stage
   c) Testing state
   d) Prototype stage

49. What is the way to narrow down the thoughts to reach at the final solution:
   a) Convergent thinking
   b) Divergent thinking
   c) None of these
   d) Both a and b

50. The goal of the prototype phase is
   a) To understand what component of your idea didn't work
   b) To understand what component of your idea work
   c) Both a and b
   d) None of these

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

21PSP13/23

First/Second Semester B.E. Degree Examination, July/August 2022
Problem Solving Through Programming

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a.   Discuss various generations of computers, highlighting features of each one.   (10 Marks)
    b.   With the basic structure of a C program and explain with an example.   (10 Marks)

OR

2   a.   Differentiate primary memory and secondary memory.   (05 Marks)
    b.   List and explain logical operators and analyze the following code and write the output with proper reasoning.
```
#include <stdio.h>
void main( )
{
    printf("7 && 0 = % d\n", 7 && 0);
    printf("7 || 0 = % d\n", 7 || 0);
    printf("!0 = %d", !0);
}
```
   (10 Marks)
    c.   Discuss basic data types supported in 'C'.   (05 Marks)

Module-2

3   a.   Write a C program to find roots of a quadratic equation.   (10 Marks)
    b.   Write the syntax of switch statement and explain with a suitable example.   (10 Marks)

OR

4   a.   Write the syntax of while and do-while statements. Also, list differences between them with example.   (06 Marks)
    b.   Write a C program to print whether a given integer number is palindrome or not.   (07 Marks)
    c.   Discuss break and continue statements with suitable examples.   (07 Marks)

Module-3

5   a.   Define arrays and discuss various ways of initializing 1D array with examples.   (10 Marks)
    b.   Write a C program to sort given integers in ascending order and using selection sort and trace by taking 5 integers.   (10 Marks)

OR

6   a.   Define strings and explain how they are declared and initialized.   (06 Marks)
    b.   Write a C program to search for a given number in an array using binary search technique.   (08 Marks)
    c.   Explain any 6 string manipulation functions with example.   (06 Marks)

Module-4

7 a. What is a user defined function? Discuss different categories of user defined functions with appropriate example for each. **(10 Marks)**
   b. Write a recursive function to find factorial of a number. **(06 Marks)**
   c. Discuss storage class specifiers. **(04 Marks)**

OR

8 a. Define recursion. Write a recursive program to find n^{th} Fibonacci number. **(08 Marks)**
   b. Write a program to find GCD and LCM of 2 numbers. **(08 Marks)**
   c. What are the advantages of writing user defined functions? **(04 Marks)**

Module-5

9 a. Differentiate structures and unions with syntax and example. **(06 Marks)**
   b. Write a C program to swap 2 numbers and use the same to explain advantage of call by reference method over call by value method. **(09 Marks)**
   c. List any 5 preprocessor directives in C. **(05 Marks)**

OR

10 a. Write a C program to add 2 complex numbers using structures. **(06 Marks)**
   b. Write a C program to compute sum, mean and standard deviation of all elements stored in an array using pointers. **(10 Marks)**
   c. What are pointers? Discuss pointer arithmetic with examples. **(04 Marks)**

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CBCS SCHEME

21ELE13/23

USN

First/ Second Semester B.E. Degree Examination, July/August 2022
Basic Electrical Engineering

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. State and explain ohm's law with its limitations. **(06 Marks)**
   b. Define form factor. Obtain its value for a sinusoidal voltage. **(08 Marks)**
   c. A circuit consists of two parallel resistors of 20 Ω and 30 Ω respectively, connected in series with a 15 Ω resistor. If the current through 15Ω resistor is 3A, find the branch currents, supply voltage and power consumed by 20Ω and 15Ω resistors. **(06 Marks)**

OR

2 a. Prove that, the circuit efficiency during maximum power transfer from source to load is only 50%. **(06 Marks)**
   b. Show that, the power consumed by a pure capacitor is zero, when connected across A.C. supply. **(08 Marks)**
   c. For the sine wave, $e = 140 \sin 314t$. Find:

   (i) Peak value   (ii) Frequency   (iii) Average value

   (iv) RMS value   (v) Time period   (vi) Instantaneous voltage at t = 3 ms
   (06 Marks)

Module-2

3 a. Develop an equation for the power consumed by a R-L series circuit. Draw the waveform of voltage, current and power. **(08 Marks)**
   b. Deduce the relationship between the line and phase values of voltage and current of a three phase star connected system. **(06 Marks)**
   c. Two impedances $Z_1 = (150 - j157)$ Ω and $Z_2 = (100 - j110)$ Ω are connected in parallel across 200 V, 50 Hz supply. Find:

   (i) Total current   (ii) Branch currents

   (iii) Total power consumed   (iv) Draw phasor diagram
   (06 Marks)

OR

4 a. Show that, only two wattmeters are sufficient to measure power in a three phase balanced star connected circuit with the help of neat circuit diagram and phasor diagram. **(08 Marks)**
   b. A balanced star connected load of $(8 + j6)$ Ω per phase is connected to a 3-phase, 230 V supply. Find the line current, power factor, active power, reactive power and total power. **(06 Marks)**
   c. A circuit consists of a resistance of 25 Ω and a capacitance of 100 µF connected in series. A supply of 200 V, 50 Hz is applied across the circuit. Find:

   (i) Impedance   (ii) Current   (iii) Power factor

   (iv) Power   (v) Voltage drop across R and C   (vi) Draw phaser diagram.
   (06 Marks)

Module-3

5 a. With the help of neat diagram, explain the construction of D.C. generator. **(08 Marks)**

b. With usual notations, derive the emf equation of a transformer. **(06 Marks)**

c. The field current in a d.c. shunt machine is 2A and the line current is 20A at 200V. Calculate:
  (i) The generated emf when working as generator
  (ii) Torque (N-m) when running at 1500 rpm as motor
  Take the armature resistance as 0.5 Ω. **(06 Marks)**

OR

6 a. Explain the losses in a transformer and how to minimize them. On what factor they depend? Give the equations for these losses. **(08 Marks)**

b. With usual notations, derive the torque equation of a D.C. motor. **(06 Marks)**

c. A transformer is rated at 100 KVA. At full load its copper loss is 1200 Watts and its iron loss is 960 Watts. Calculate:
  (i) The efficiency at full load, UPf
  (ii) The efficiency at half load, 0.8 p.f.
  (iii) The maximum efficiency at 0.85 p.f. for the new load KVA 89 KVA at which maximum efficiency occurs. **(06 Marks)**

Module-4

7 a. With relevant diagram, explain the construction of three phase induction motor. **(08 Marks)**

b. Explain the advantages of rotating magnetic field over the rotating armature in a synchronous generator. **(06 Marks)**

c. A 10 pole induction motor supplied by a 6 pole alternator which is driven at 1200 rpm. If the motor runs at a slip of 3%, what is its speed and frequency of rotor induced emf. **(06 Marks)**

OR

8 a. Derive an emf equation of a synchronous generator. Explain the significance of winding factor. **(08 Marks)**

b. Define slip of a 3-phase induction motor and derive the relation between supply frequency and rotor current frequency. **(06 Marks)**

c. A 3-phase, 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.003 webers and the speed is 375 rpm. Find the frequency, phase emf and line emf. **(06 Marks)**

Module-5

9 a. With a single line diagram, explain the power transmission and distribution. **(06 Marks)**

b. What is earthing? With a neat diagram, explain pipe earthing. **(08 Marks)**

c. Define tariff. Explain briefly the two part tariff with its advantages and disadvantages. **(06 Marks)**

OR

10 a. What is electric shock? Give the list of preventive measures against the shock. **(06 Marks)**

b. With neat diagram, explain the working of fuse and RCCB (Residual Current Circuit Breaker). **(08 Marks)**

c. A consumer has a maximum demand of 200 KW at 40% load factor. If the tariff is Rs.100 per KW of maximum demand plus 10 paise per KWh. Find the overall cost per KWh. **(06 Marks)**

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   21ELN14/24

First/Second Semester B.E. Degree Examination, July/August 2022
Basic Electronics and Communication Engineering

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, explain the working of DC power supply. Also mention the principle components used in each block. **(07 Marks)**

   b. Sketch the circuit of each of the following based on the use of operational amplifiers:
   (i) Differentiator   (ii) Integrator   (iii) Inverting amplifier   **(06 Marks)**

   c. Explain the working of Bi phase Full wave rectifier circuit with neat diagram and waveforms. **(07 Marks)**

OR

2 a. Mention the advantages of negative feed-back in amplifiers circuits. With relevant equations and diagram, explain the concept of negative feedback. **(07 Marks)**

   b. With suitable circuit diagram, explain single stage astable multivibrator using operational amplifier. **(07 Marks)**

   c. Explain the conditions for sustained oscillations. Determine the frequency of oscillation of a three stage ladder network in which C = 10 nF and R = 10 KΩ. **(06 Marks)**

Module-2

3 a. With a neat block diagram, explain the arrangement of a microcontroller system. **(06 Marks)**

   b. Design a 3:8 decoder and show its implementation using basic gates. **(08 Marks)**

   c. With the help of truth table, explain a full adder using logic gates. **(06 Marks)**

OR

4 a. Write a note on different data types mentioning the bit size and range of values supported. **(06 Marks)**

   b. Define a bistable. Using truth table and logic circuit, explain RS bistable. **(07 Marks)**

   c. What is multiplexer? With truth table and logic circuit, explain 8:1 multiplexer. **(07 Marks)**

Module-3

5 a. Compare embedded system and general computing system. Also provide the application areas of embedded systems. **(08 Marks)**

   b. Explain the different configurations of 7-segment LED display. **(06 Marks)**

   c. Write a note on classification of embedded systems. **(06 Marks)**

OR

6 a. Define actuator. With relevant diagram, explain the operation of Relay, Push button, Piezo buzzer. **(08 Marks)**

   b. Bring out the differences between RISC and CISC and Harvard and Vonneumann architecture. **(06 Marks)**

   c. Bring out the main features of UART and USB. **(06 Marks)**

1 of 2

CBCS SCHEME

USN | | | | | | | | | |

21MAT11

First Semester B.E. Degree Examination, July/August 2022
Calculus and Differential Equations

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a.   With usual notation prove that $\tan\phi = r\left(\dfrac{d\theta}{dr}\right)$.   **(06 Marks)**

    b.   Find the angle between the curves $r = 2\sin\theta$ and $r = 2\cos\theta$.   **(07 Marks)**

    c.   Find the radius of curvature of the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ at the point $\left(\dfrac{a}{4}, \dfrac{a}{4}\right)$.   **(07 Marks)**

OR

2   a.   With usual notation prove that

$$\rho = \frac{\left(1 + y_1^2\right)^{\frac{3}{2}}}{y_2}.$$ **(06 Marks)**

    b.   Find the radius of curvature for the curve $r^n = a^n \sin n\theta$.   **(07 Marks)**

    c.   Show that $r = 4\sec^2\theta/2$ and $r = 9\,\text{cosec}^2\,\theta/2$ the pair of curves cut orthogonally.   **(07 Marks)**

Module-2

3   a.   Expand $Y = \log(1 + \sin x)$ upto the term contains x^4 by Maclaurin's series expansion.   **(06 Marks)**

    b.   If $u = f(2x - 3y, 3y - 4z, 4z - 2x)$, show that $6u_x + 4u_y + 3u_z = 0$.   **(07 Marks)**

    c.   Show that the function $f(x, y) = x^3 + y^3 - 63x - 63y + 12xy$ is maximum at $(-7, -7)$.   **(07 Marks)**

OR

4   a.   Evaluate $\underset{x \to 0}{\text{Lt}}\,(\cos x)^{\frac{1}{x^2}}$.   **(06 Marks)**

    b.   If $u = x^3 + y^3$ where $x = a\cos t$, $y = b\sin t$ find $\dfrac{dU}{dt}$.   **(07 Marks)**

    c.   If $U = e^x \cos y$, $V = e^x \sin y$. Find $\dfrac{\partial(u, v)}{\partial(x, y)}$.   **(07 Marks)**

Module-3

5 a. Solve for P : $xp^2 + (y - x) p - y = 0$; where $p = \dfrac{dy}{dx}$. (06 Marks)

   b. Show that the family of parabolas $y^2 = 4a(x + a)$ is self orthogonal. (07 Marks)

   c. Solve $(x^2 + y^2 + x)\, dx + xy\, dy = 0$. (07 Marks)

OR

6 a. Solve : $\left[1 + \log x + \log y\right]dx + \left(1 + \dfrac{x}{y}\right)dy = 0$. (06 Marks)

   b. Solve : $p = \sin(y - xp)$. Also find its singular solutions. (07 Marks)

   c. A body originally at 80°C cools down to 60°C in 20 minutes, the temperature of the air being 40°C. What will be the temperature of the body after 40 minutes from the original? (07 Marks)

Module-4

7 a. Solve : $\dfrac{d^4y}{dx^4} - 4\dfrac{d^2y}{dx^2} + 4y = 0$. (06 Marks)

   b. Solve : $(D^2 + 4)y = e^x + \cos 2x$. (07 Marks)

   c. Using Variation of parameter method, solve

   $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} = e^x \sin x$. (07 Marks)

OR

8 a. Solve : $(D^2 - 1)y = 1 + x + x^2$. (06 Marks)

   b. Solve : $(D^2 + D + 1)y = (1 - e^x)$. (07 Marks)

   c. Solve : $(1 + x)^2 \dfrac{dy^2}{dx^2} + (1 + x)\dfrac{dy}{dx} + y = 2\sin[\log(1 + x)]$. (07 Marks)

Module-5

9   a.   Find the rank of the matrix :

$$\begin{bmatrix} -1 & 2 & 3 & -2 \\ 2 & -5 & 1 & 2 \\ 3 & -8 & 5 & 2 \\ 5 & -12 & -1 & 6 \end{bmatrix}.$$

(06 Marks)

   b.   Find for what values of λ and μ the system of linear equations :
        $x + y + z = 6$
        $x + 2y + 5z = 10$
        $2x + 3y + \lambda z = \mu$
        has
        i)   a unique solution
        ii) no solution
        iii) Infinitely many solutions.

(07 Marks)

   c.   Solve the system of equations :
        $10x + 2y + z = 9$
        $2x + 20y - 2z = -44$
        $-2x + 3y + 10z = 22$
        by Gauss Seidel method taking $(0, 0, 0)$ as an initial approximate root (carry out 3 iteration).

(07 Marks)

OR

10 a.   Find the rank of the matrix :

$$\begin{bmatrix} 221 & 22 & 23 & 24 \\ 22 & 23 & 24 & 25 \\ 23 & 24 & 25 & 26 \\ 24 & 25 & 26 & 27 \end{bmatrix}.$$

(06 Marks)

   b.   Solve the system of equations by Gauss – Jordan method,
        $x + y + z = 9$
        $x - 2y + 3z = 8$
        $2x + y - z = 3.$

(07 Marks)

   c.   Using Rayleigh power method find the largest eigen value and the corresponding eigen vector of the matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & 1 \\ 2 & -1 & 3 \end{bmatrix}$$

by taking $(1, 1, 1)^T$ as initial eigen vector (carryout 5 iterations).

(07 Marks)

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