

# PGCET-2023

Seat No. \_\_\_\_\_

SUB: Metallurgy Engineering

Time: 1 Hour 30 minutes

**Instructions:**

1. Ensure that all pages are printed.
2. Use Black ball pen only
3. Change in option is not allowed
4. There is no negative marking
5. Use of non-programmable scientific calculator is allowed

|    |  |                          |   |                                      |
|----|--|--------------------------|---|--------------------------------------|
| 1. | Critical value of the Gibbs energy of nucleation at equilibrium temperature is   |                          |   |                                      |
|    | A  | zero                     | B | infinite                             |
|    | C  | positive                 | D | negative                             |
| 2. | When two phases $\alpha$ and $\beta$ in an alloy are in thermodynamic equilibrium, then  |                          |   |                                      |
|    | A  | $c_p^\alpha = c_p^\beta$ | B | $V_m^\alpha = V_m^\beta$             |
|    | C  | $G_m^\alpha = G_m^\beta$ | D | $\bar{G}_i^\alpha = \bar{G}_i^\beta$ |
| 3. | In the Ellingham diagram for oxides, C-CO line cuts the M-MO line at temperature $T_1$ and the M'-M'O line at a higher temperature $T_2$ . At a temperature greater than $T_1$ and less than $T_2$ , carbon can reduce |                          |   |                                      |
|    | A  | MO                       | B | M'O                                  |
|    | C  | both MO and M'O          | D | neither MO and M'O                   |
| 4. | The total number of possible heat transfer mode(s) is  |                          |   |                                      |
|    | A  | 3                        | B | 2                                    |
|    | C  | 4                        | D | 5                                    |
| 5. | Which one of the following can give information about the corrosion rate?  |                          |   |                                      |
|    | A  | Pourbaix diagram         | B | Galvanic series                      |
|    | C  | Polarization technique   | D | EMF series                           |
| 6. | If the systems A and B are in thermal equilibrium with system C, then system A is also in thermal equilibrium with system B. In thermodynamics, this statement is  |                          |   |                                      |
|    | A  | zeroth law               | B | 1st law                              |
|    | C  | 2nd law                  | D | 3rd law                              |
| 7. | The amount of heat exchanged between system and surroundings under constant pressure is called   |                          |   |                                      |
|    | A  | Entropy                  | B | Free energy                          |
|    | C  | Internal energy          | D | Enthalpy                             |
| 8. | The correct statement about isothermal process is  |                          |   |                                      |
|    | A  | $dT = 0$                 | B | $dU = 0$                             |
|    | C  | $q = -w$                 | D | All                                  |
| 9. | Which of the following contain higher entropy?   |                          |   |                                      |
|    | A  | 1 mole acetylene         | B | 1 mole ethane                        |
|    | C  | 1 mole ethylene          | D | 1 mole methane                       |

|    |   |  |   |  |
|----|---|--|---|--|
| 10 | Which of the following statements is true?  |  |   |  |
|    | A   | $q = dH$ at constant T; $q = dE$ at constant V | B | $q = dH$ at constant P; $q = dE$ at constant T   |
|    | C   | $q = dH$ at constant V; $q = dE$ at constant P | D | $q = dH$ at constant P; $q = dE$ at constant V   |
| 11 | If $\Delta G$ is -ve than the reaction taking place is                                    |  |   |  |
|    | A   | Exothermic                                     | B | Endothermic                                      |
|    | C   | Ore reaction                                   | D | Can't say  |
| 12 | In cathodic protection  |  |   |  |
|    | A   | Increase electrode potential                   | B | Decrease electrode potential                     |
|    | C   | Normalise electrode potential                  | D | No effect on electrode potential                 |
| 13 | Rate of reaction is studied with  |  |   |  |
|    | A   | Thermodynamics                                 | B | Kinetics   |
|    | C   | Statics  | D | Mechanics  |
| 14 | Martensitic transformation is   |  |   |  |
|    | A   | Diffusion controlled                           | B | Diffusionless                                    |
|    | C   | Eutectoid reaction product                     | D | Eutectic reaction product                        |
| 15 | Passivity is due to   |  |   |  |
|    | A   | Higher EMF                                     | B | Oxide film                                       |
|    | C   | Lower EMF                                      | D | All  |
| 16 | In a reversible process   |  |   |  |
|    | A   | $dE - dW = TdS$                                | B | $dW - dE = TdS$                                  |
|    | C   | $TdS - TdE + dW < 0$                           | D | $Tds = dE + dW$                                  |
| 17 | Sulphide ore is generally concentrated by   |  |   |  |
|    | A   | Roasting                                       | B | Froth floatation process                         |
|    | C   | Reduction by carbon                            | D | Tempering  |
| 18 | Smelting is carried out in  |  |   |  |
|    | A   | Blast furnace                                  | B | Muffle furnace                                   |
|    | C   | Open Hearth furnace                            | D | Electric furnace                                 |
| 19 | In the froth floatation process for the purification of ores, ore particles float because |  |   |  |
|    | A   | They are light                                 | B | Their surface is not easily wetted by water      |
|    | C   | They bear electrostatic charge                 | D | They are insoluble                               |
| 20 | Dolomite is a mineral of which metal ?  |  |   |  |
|    | A   | Iron   | B | Aluminium  |
|    | C   | Calcium  | D | Copper   |
| 21 | Coke is added in iron blast furnace to  |  |   |  |
|    | A   | Reduce and melt the iron ore                   | B | Remove sulphur and phosphorous from molten metal |
|    | C   | Increase the fluidity of slag                  | D | None of these                                    |

|    |  |   |   |  |
|----|--|---|---|--|
| 22 | With increase in steel melting furnace temperature, the slag viscosity...          |   |   |  |
|    | A  | Increases   | B | Remains same   |
|    | C  | Decreases   | D | May increase or decrease depends on slag composition |
| 23 | Which is not an autogeneous process?   |   |   |  |
|    | A  | Bessemer process                                    | B | Open hearth furnace                                  |
|    | C  | LD converter  | D | Basic oxygen furnace                                 |
| 24 | Viscosity of highly basic slag can be reduced by the addition of                   |   |   |  |
|    | A  | Sand  | B | Bauxite  |
|    | C  | Both (a) & (b)                                      | D | Neither (a) nor (b)                                  |
| 25 | In a basic steel making furnace, the   |   |   |  |
|    | A  | Refractory lining is basic in nature                | B | Flux used is necessarily basic                       |
|    | C  | Slag is highly acidic in nature                     | D | None of these  |
| 26 | Which is used most extensively as a deoxidizer producing killed steel in practice? |   |   |  |
|    | A  | Aluminium   | B | Nickel   |
|    | C  | Bauxite   | D | Zirconia   |
| 27 | Which steel making furnace has no oxidizing atmosphere of its own?                 |   |   |  |
|    | A  | LD converter  | B | Bessemer converter                                   |
|    | C  | Open hearth furnace                                 | D | Electric furnace                                     |
| 28 | Ferrosilicon is added in the molten steel ladle to                                 |   |   |  |
|    | A  | Carburised  | B | deoxidise  |
|    | C  | Cool  | D | Solidify   |
| 29 | Slag of lead blast furnace consists mainly of _____ of iron and calcium.           |   |   |  |
|    | A  | Oxides  | B | Silicates  |
|    | C  | Sulphate  | D | chlorides  |
| 30 | Leaching of roasted zinc ore is done by  |   |   |  |
|    | A  | Dilute H <sub>2</sub> SO <sub>4</sub>               | B | Concentrated H <sub>2</sub> SO <sub>4</sub>          |
|    | C  | Dilute HCL  | D | Dilute HNO <sub>3</sub>                              |
| 31 | Which of the following is not a mineral dressing operation?                        |   |   |  |
|    | A  | Roasting  | B | Comminution  |
|    | C  | Calcining   | D | Distillation   |
| 32 | Density of slag compared to that pig iron is about                                 |   |   |  |
|    | A  | One tenth   | B | One third  |
|    | C  | Two forth   | D | Three forth  |
| 33 | Which one has body centered cubic (b.c.c.) lattice of crystals?                    |   |   |  |
|    | A  | Na  | B | Zn   |
|    | C  | Ag  | D | Pb   |
| 34 | In screw dislocation, the dislocation line is                                      |   |   |  |
|    | A  | Parallel to Burger's vector                         | B | Perpendicular to Burger's vector                     |
|    | C  | At an angle of thirty degree to the Burger's vector | D | None of these  |

|    |  |                                   |   |                                   |
|----|--|-----------------------------------|---|-----------------------------------|
| 35 | Iron is non magnetic   |                                   |   |                                   |
|    | A  | Above Curie point                 | B | When its lattice structure is fcc |
|    | C  | When it is in $\gamma$ -iron form | D | All                               |
| 36 | The property which enables metals to be drawn into wire is known as  |                                   |   |                                   |
|    | A  | Malleability                      | B | Ductility                         |
|    | C  | Straining                         | D | Elastic deformation               |
| 37 | The beginning of transition from austenite to ferrite on iron-carbon equilibrium diagram is represented by |                                   |   |                                   |
|    | A  | Line $A_1$                        | B | Line $A_{cm}$                     |
|    | C  | Line $A_3$                        | D | None of the above                 |
| 38 | The teeth of spur gear is hardened by  |                                   |   |                                   |
|    | A  | Cold working                      | B | Quenching                         |
|    | C  | Dispersion hardening              | D | Induction hardening               |
| 39 | Tree like structure formed in crystal growth is known as   |                                   |   |                                   |
|    | A  | Bainitic                          | B | Dendritic                         |
|    | C  | HCP                               | D | Luder band                        |
| 40 | In salt bath furnaces, heat is transferred to the charge mainly by   |                                   |   |                                   |
|    | A  | Conduction                        | B | Convection                        |
|    | C  | Radiation                         | D | None of these                     |
| 41 | Final structure of austempered steel   |                                   |   |                                   |
|    | A  | Pearlite                          | B | Ferrite + Graphite                |
|    | C  | Bainite                           | D | Martensite                        |
| 42 | Energizer used in pack carburizing is  |                                   |   |                                   |
|    | A  | $BaCO_3$                          | B | $K_2SO_4$                         |
|    | C  | $Na_2SO_4$                        | D | $H_2O_2$                          |
| 43 | Not a characteristic property of ceramic material  |                                   |   |                                   |
|    | A  | High temperature stability        | B | High mechanical strength          |
|    | C  | Low elongation                    | D | Low hardness                      |
| 44 | Which one of the following is not the purpose of full annealing  |                                   |   |                                   |
|    | A  | Refines grains                    | B | Induces softness                  |
|    | C  | Removes strains and stresses      | D | Produces hardest material         |
| 45 | Miller indices of the diagonal plane of a cube are   |                                   |   |                                   |
|    | A  | (200)                             | B | (111)                             |
|    | C  | (010)                             | D | (110)                             |
| 46 | Relative amounts of phases in a region can be deduced using  |                                   |   |                                   |
|    | A  | Phase rule                        | B | Lever rule                        |
|    | C  | Either                            | D | None                              |

|    |  |   |   |                             |
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| 47 | System consisting of ice, water and steam at triple point is   |   |   |                             |
|    | A  | Non-variant   | B | Bi-variant                  |
|    | C  | Tri-variant   | D | Uni-variant                 |
| 48 | Addition of zinc to copper improves its  |   |   |                             |
|    | A  | Machinability   | B | Corrosion resistance        |
|    | C  | Hardness  | D | Ductility and strength      |
| 49 | As compared to the engineering stress-engineering strain curve, the true stress-true strain curve for a given material |   |   |                             |
|    | A  | lies above and to the left                              | B | lies below and to the right |
|    | C  | crosses the engineering stress-engineering strain curve | D | is identical                |
| 50 | Which one of the following does NOT improve fatigue life of a steel component?   |   |   |                             |
|    | A  | Nitriding   | B | Shot-peening                |
|    | C  | Decarburization   | D | Improving surface finish    |
| 51 | When a metal returns to its original shape after an applied load has been removed, the metal is said to have:          |   |   |                             |
|    | A  | Plasticity  | B | Malleability                |
|    | C  | Ductility   | D | Elasticity                  |
| 52 | Fluctuating load is: cyclic stresses, below the UTS on a weld component may lead to                                    |   |   |                             |
|    | A  | Yield failure   | B | Fatigue failure             |
|    | C  | Tensile failure   | D | Shear failure               |
| 53 | Creep rate decreases in _____ stage of creep.  |   |   |                             |
|    | A  | First   | B | Second                      |
|    | C  | Third   | D | No effect of stages         |
| 54 | Longitudinal strength of fiber reinforced composite is mainly influenced by  |   |   |                             |
|    | A  | Fiber strength  | B | Fiber volume fraction       |
|    | C  | Fiber orientation                                       | D | Fiber length                |
| 55 | Hardness of martensite measured on Rockwell  |   |   |                             |
|    | A  | C scale   | B | Both                        |
|    | C  | B scale   | D | None of above               |
| 56 | Plastic deformation results from   |   |   |                             |
|    | A  | Slip  | B | Twinning                    |
|    | C  | None of above   | D | Both                        |
| 57 | Thermodynamically stable defect is   |   |   |                             |
|    | A  | Volume defects  | B | Dislocations                |
|    | C  | Line defects  | D | Vacancy                     |
| 58 | Due to Frenkel defect, the density of ionic solids :   |   |   |                             |
|    | A  | increases   | B | does not change             |
|    | C  | decreases   | D | Can not say                 |

|    |  |   |   |                                      |
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| 59 | Frank-Read source  |   |   |                                      |
|    | A  | Generates dislocation                                 | B | Hinders the movement of dislocation  |
|    | C  | Is responsible for polygonisation in edge dislocation | D | Is responsible for dislocation climb |
| 60 | In fracture toughness characterized by $K_{Ic}$ , I in the subscript indicates loading by  |   |   |                                      |
|    | A  | parallel shear mode                                   | B | Forward shear mode                   |
|    | C  | perpendicular shear mode                              | D | crack opening mode                   |
| 61 | The number of independent slip systems required for a crystal to undergo a general change in shape by slip are   |   |   |                                      |
|    | A  | 3   | B | 4                                    |
|    | C  | 5   | D | 6                                    |
| 62 | When load is applied to a material, 'instantaneous' strain develops with   |   |   |                                      |
|    | A  | speed of light  | B | speed of sound                       |
|    | C  | half the speed of light                               | D | infinite speed                       |
| 63 | With an increase in cold working, tensile strength of material   |   |   |                                      |
|    | A  | Decreases   | B | Remain constant                      |
|    | C  | First decreases then increases                        | D | Increases                            |
| 64 | In a steel, which has improved creep properties at elevated temperature, which one of the following elements helps in this improvement?                      |   |   |                                      |
|    | A  | Tungsten  | B | Molybdenum                           |
|    | C  | Carbon  | D | Manganese                            |
| 65 | Risers are not required for casting  |   |   |                                      |
|    | A  | stainless steel                                       | B | white cast iron                      |
|    | C  | plain carbon steel                                    | D | grey cast iron                       |
| 66 | For a good quality brazing, the molten filler alloy should have  |   |   |                                      |
|    | A  | low contact angle with the base metal                 | B | low density                          |
|    | C  | high surface tension                                  | D | high viscosity                       |
| 67 | Arc welding is done using current, voltage and welding speed of 200 A, 20 V and 0.01 m/s, respectively. The heat input in kJ per unit length is _____        |   |   |                                      |
|    | A  | 420   | B | 450                                  |
|    | C  | 380   | D | 400                                  |
| 68 | Applying preheat when welding carbon manganese steel is normally done to avoid:  |   |   |                                      |
|    | A  | Slag inclusions                                       | B | Porosity                             |
|    | C  | Hydrogen cracking                                     | D | Lack of sidewall fusion              |
| 69 | Which of following mechanical properties of a weld in carbon manganese steel is most affected if the heat input per unit length of weld is excessively high? |   |   |                                      |
|    | A  | Elongation  | B | Hardness                             |
|    | C  | Tensile strength                                      | D | Toughness                            |

|    |   |   |   |                                  |
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| 70 | Which of the following defects is unlikely to be found by visual inspection.                            |   |   |                                  |
|    | A   | Linear misalignment                                     | B | Linear slag inclusion            |
|    | C   | Overlap   | D | Undercut                         |
| 71 | Which defect would you expect to obtain in TIG welds in non-deoxidized steel?                           |   |   |                                  |
|    | A   | Under cut   | B | Tungsten inclusions              |
|    | C   | Porosity  | D | Linear misalignment              |
| 72 | Which of the following destructive tests would indicate the toughness of weld metal/parent metal – HAZ. |   |   |                                  |
|    | A   | Nick break  | B | Macro                            |
|    | C   | Hardness  | D | Charpy vee notch                 |
| 73 | Ultrasonic would be prefer over radiography due to:   |   |   |                                  |
|    | A   | Ability to find more defects                            | B | Lowest skill requirements        |
|    | C   | Ability to detect laminations                           | D | Both a) and c)                   |
| 74 | Which of the following can arise from copper inclusions is a ferrite steel weld?                        |   |   |                                  |
|    | A   | HAZ cracks  | B | Weld metal cracks                |
|    | C   | Lamellar tearing  | D | Porosity                         |
| 75 | Which of the following NDT methods would not detect sub-surface defects?                                |   |   |                                  |
|    | A   | MPI   | B | Ultrasonic testing               |
|    | C   | Radiography   | D | Dye penetrant testing            |
| 76 | Which arc welding process utilizes a non-consumable electrode?  |   |   |                                  |
|    | A   | MIG   | B | MMA                              |
|    | C   | TIG   | D | SAW                              |
| 77 | Chills are used for   |   |   |                                  |
|    | A   | Promote good directional and progressive solidification | B | Prevent core shifting            |
|    | C   | Impart flowing property and cleaning                    | D | Reduce porosity                  |
| 78 | Flash Length increase in close die forging  |   |   |                                  |
|    | A   | Creates porosity  | B | Cracks the workpiece             |
|    | C   | decrease forging pressure in die                        | D | Increase forging pressure in die |
| 79 | The presence of tension in the plane of the sheet in rolling can  |   |   |                                  |
|    | A   | Increase rolling pressure                               | B | decrease rolling pressure        |
|    | C   | No effect on rolling pressure                           | D | Both a) and b)                   |
| 80 | When referring to TIG welding, the shielding gas could be   |   |   |                                  |
|    | A   | Hydrogen  | B | CO2                              |
|    | C   | Argon + Helium  | D | All of the above                 |

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| 81 | Solution of differential equation $(x^2 - 2xy)dx + (siny - x^2)dy = 0$ is given by   |   |   |   |
|    | A  | $x^2 - (x^2y + cosy) = c$                             | B | $x^2 - 3(x^2y + siny) = c$                            |
|    | C  | $x^2 + 3(x^2y + cosy) = c$                            | D | $x^3 - 3(x^2y + cosy) = c$                            |
| 82 | Solution of differential equation $\frac{d^2y}{dx^2} + 4y = \cos 2x$ is given by   |   |   |   |
|    | A  | $y = c_1 \cos 2x + c_2 \sin 2x + \frac{x}{4} \sin 2x$ | B | $y = c_1 \cos 2x + c_2 \sin 2x + \frac{x}{4} \cos 2x$ |
|    | C  | $y = c_1 \cos 2x + c_2 \sin 2x + \sin 2x$             | D | $y = c_1 \cos 2x + c_2 \sin 2x + \cos 2x$             |
| 83 | Laplace Transformation of $t \cos t$ is equal to   |   |   |   |
|    | A  | $\frac{1}{(s^2 + 1)^2}$                               | B | $\frac{s^2 - 1}{(s^2 + 1)^2}$                         |
|    | C  | $\frac{s^2}{(s^2 - 1)^2}$                             | D | $\frac{s^2 + 1}{(s^2 - 1)^2}$                         |
| 84 | Inverse Laplace Transformation of $\frac{1}{(s^2 + 16s + 89)}$ is equal to   |   |   |   |
|    | A  | $\frac{1}{5} e^{-8t} \cos 5t$                         | B | $e^{-8t} \sin 5t$                                     |
|    | C  | $\frac{1}{5} e^{-8t} \sin 5t$                         | D | $e^{-8t} \cos 5t$                                     |
| 85 | $\lim_{x \rightarrow \pi/2} \left( \frac{\cos x}{\frac{\pi}{2} - x} \right)$ is equal to   |   |   |   |
|    | A  | 2   | B | 0   |
|    | C  | 1/2   | D | 1   |
| 86 | If $x = r \cos \theta, y = r \sin \theta$ then $\frac{\partial^2 \theta}{\partial x^2} + \frac{\partial^2 \theta}{\partial y^2}$ is equal to |   |   |   |
|    | A  | 0   | B | $\frac{xy}{(x + y)^2}$                                |
|    | C  | $\frac{xy}{(x^2 + y^2)^2}$                            | D | $\frac{1}{(x^2 + y^2)^2}$                             |
| 87 | If $\phi = xy + yz + xz$ then $\text{curl}(\text{grad} \phi)$ is equal to  |   |   |   |
|    | A  | 1   | B | 4   |
|    | C  | 2   | D | 0   |



|    |  |                      |   |                  |
|----|--|----------------------|---|------------------|
| 88 | Vector Field $\vec{F} = yi + zj + 5k$ then $\text{curl curl } \vec{F}$ is                                      |                      |   |                  |
|    | A  | $i + j + k$          | B | $i - j + k$      |
|    | C  | 0                    | D | $2i + j$         |
| 89 | Which of the following is correct for the system<br>$x + y + z = 0, \quad x - y - z = 0, \quad -x - y + z = 0$ |                      |   |                  |
|    | A  | Non Trivial Solution | B | Trivial Solution |
|    | C  | No solution          | D | None of these    |
| 90 | If $A = \begin{bmatrix} 3 & 6 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ then an Eigen values of $A^2$ are   |                      |   |                  |
|    | A  | 1, 4, 9              | B | 1, 2, 3          |
|    | C  | 1, 4, 5              | D | 1, 2, 5          |
| 91 | If $A = \begin{bmatrix} 5 & 7 & 9 \\ 0 & 5 & 0 \\ 0 & 0 & 9 \end{bmatrix}$ then rank of the matrix A is.       |                      |   |                  |
|    | A  | 1                    | B | 0                |
|    | C  | 2                    | D | 3                |
| 92 | If $f(z) = \frac{z-5}{(z-3)(z^2-9z+20)}$ which are the points where $f(z)$ fails to be analytic ?              |                      |   |                  |
|    | A  | -3,-4                | B | 3,4              |
|    | C  | -3,-5                | D | 3,5              |
| 93 | Value of $\int_c \frac{1}{(z-4)^3} dz$ , ( where $c$ is $ z  = 2$ ) is.  |                      |   |                  |
|    | A  | 0                    | B | $2\pi i$         |
|    | C  | $\pi i$              | D | $3\pi i$         |
| 94 | Residue of $f(z) = \frac{z+5}{(z+2)(z+3)}$ at pole -2 is.  |                      |   |                  |
|    | A  | 2                    | B | 5                |
|    | C  | 3                    | D | 1                |

|     |   |                             |   |                              |
|-----|---|-----------------------------|---|------------------------------|
| 95  | The Mean, Median and mode of 30, 25, 23, 24, 23 are.  |                             |   |                              |
|     | A   | Mean=25, Median=23, Mode=24 | B | Mean=25, Median=24, Mode= 23 |
|     | C   | Mean=24, Median=25, Mode=23 | D | Mean=25, Median=24, Mode= 24 |
| 96  | If A and B are independent event where $P(A)=1/3$ and $P(B)=1/6$ then $P(A \cup B)$ is  |                             |   |                              |
|     | A   | 1/9                         | B | 2/9                          |
|     | C   | 1/3                         | D | 4/9                          |
| 97  | The lifetime T of an alkaline battery is exponentially distributed with $\lambda = 0.04$ per hour. What is the standard deviation of the battery life time ?  |                             |   |                              |
|     | A   | 25 hrs.                     | B | 30 hrs.                      |
|     | C   | 35 hrs.                     | D | 20 hrs.                      |
| 98  | Value of $\int_1^2 \frac{1}{x^2} dx$ with $h = 0.5$ by Simpsons $\frac{1}{3}$ rule is.  |                             |   |                              |
|     | A   | 0.0546                      | B | 0.6542                       |
|     | C   | 0.5046                      | D | 0.546                        |
| 99  | A numerical solution of the equation $f(x) = x^3 + 5x - 2 = 0$ can be obtained using Newton-Raphson method. If the initial guess $x_0 = 1$ for the iteration then what is the value of first iteration? |                             |   |                              |
|     | A   | 1.5                         | B | 0.25                         |
|     | C   | 0.15                        | D | 0.5                          |
| 100 | If $\frac{dy}{dx} = x + 2y$ and $y(0) = 0.5$ , taking $h=0.1$ using second order Runge-Kutta method what is the value of $y(0.1)$ ?   |                             |   |                              |
|     | A   | 1.615                       | B | 0.615                        |
|     | C   | 0.516                       | D | 1.516                        |